

ISA Certified Tree Climber

EXAMINATION OUTLINE

About the Program

ISA certification is a voluntary program that tests and certifies a professional's achievement of an industry-accepted standard level of knowledge and skill in the field of arboriculture. This credential is a sign to the public, employers, and peers that a tree care specialist has achieved a fundamental level of knowledge and skills needed to climb trees and perform arboricultural work in a safe and efficient manner. As a voluntary program, earning this title shows a professional's commitment to a professional code of ethics, safety best practices in the industry, and continuing education.

Domains

Domains are the major responsibilities or duties that characterize the practice of tree climbing for performance of arboricultural work. The weight or percentages denote the amount of the exam that is devoted to each domain.

- Safety (26%)
- Tree Climbing and Rigging (22%)
- Tree Removal (22%)
- Tree Identification and Health (10%)
- Pruning (20%)

Safety

Weight: 26%

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Task A: Comply with laws and regulations related to your geographical area regarding the tree worker, other workers, and other persons near the work zone.

Knowledge of:

- 1. Industry-accepted safety standards and requirements (e.g., ANSI Z133 Safety Requirements for Arboricultural Operations) Trunk, branch, twig, and leaf anatomy and functions
- ISO 11681-2:2011/AMD 1:2017 (Machinery for forestry — Portable chain-saw safety requirements and testing
 - Part 2: Chain-saws for tree service Amendment 1)
- 3. Fire safety (i.e., safe use of gas-powered and electric tools)
- 4. Work zone security, work planning, and communication best practices
- Industry-accepted safety standards and requirements regarding working near electrical systems (e.g., ANSI Z133 Safety Requirements for Arboricultural Operations)

- 1. Referring to relevant laws and regulations from all levels of government
- 2. Accessing and maintaining reference materials
- 3. Managing traffic hazards
- 4. Preparing the work zone



Task B: Utilize appropriate personal protective equipment (PPE) to protect the health and safety of the tree worker.

Knowledge of:

- 1. Head protection systems (e.g., climbing helmets, hardhats)
- 2. Eye protection systems (e.g., protective glasses, goggles, face shields)
- 3. Hearing protection (e.g., earplugs, earmuffs)
- 4. Leg protection (e.g., chainsaw protective chaps, chainsaw protective pants)
- 5. Foot protection (e.g., protective toe cap and shank, adequate ankle support)
- 6. Hand protection (e.g., cut resistant and anti-vibration gloves)

Task C: Inspect for hazards in the work zone that involve electrical systems.

Knowledge of:

- 1. Sources of direct contact with electrical systems
- 2. Sources of indirect contact with electrical systems
- 3. Minimum approach distances
- 4. Weather-related interactions with electrical systems
- 5. Basic properties of electricity (e.g., voltage, conductance)
- 6. Common electrical system structures and hardware (e.g., pole/line hardware)

Skills in:

- 1. Selecting appropriate PPE
- 2. Inspecting PPE for usage
- 3. Wearing and adjusting PPE
- 4. Maintaining PPE

Skills in:

- 1. Assessing distances between electrical systems and a tree's parts, tree workers, work being performed, tools, and equipment
- 2. Identifying what stage of electrical distribution is being carried by the line (e.g., transmission, primary distribution, secondary distribution)

Task D: Review the documentation pertinent to the work then inspect the tree and site for potential hazards before the job briefing is performed to determine what controls should be implemented to mitigate any identified hazards to ensure the safety of the tree worker, other workers, other persons, and property near the work zone.

Knowledge of:

- 1. Signs and symptoms of trunk and/or root decay (e.g., crown dieback, fungal fruiting bodies, sloughing bark, termites, boring insects, carpenter ants)
- 2. Mechanical or physical damage done onto tree and/or root system (e.g., trenching, broken tree parts, trunk damage, soil heaving)
- 3. Species-related patterns of whole tree or tree part failure
- 4. Local insects and other animals that present hazards to workers (e.g., arboreal mammals, insects, reptiles)

- 1. Reviewing documentation regarding the work
- 2. Visually inspecting the tree for hazards (e.g., root collar, trunk, canopy)
- 3. Assessing tree structure (i.e., shape, lean, cracks, splits, excessive weight)
- 4. Visually inspecting the area immediately surrounding the tree
- 5. Determining if the tree can withstand the forces to be applied during the work
- 6. Communicating hazards identified and seeking alternative measures and/or next steps with pertinent stakeholders
- 7. Recommending alternative methods for completing job tasks (e.g., aerial lift, pole tools, crane) if tree is unsafe to climb

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Task E: Aid in providing care or oversight during emergency situations involving physical harm or hazardous conditions that pose a safety risk to the tree worker, other workers, and other persons near the work zone.

Knowledge of:

- 1. Emergency action plan
- 2. First aid
- 3. Cardiopulmonary Resuscitation (CPR)
- 4. Aerial rescue
- 5. Electrical hazards
- 6. Extreme weather

Skills in:

- 1. Administering basic first aid
- 2. Administering CPR
- 3. Coordinating an aerial rescue
- 4. Conducting an aerial rescue
- 5. Assessing environmental hazards
- 6. Communicating with emergency responders during an emergency

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Weight: 22%

Tree Climbing and Rigging

Task A: List the attributes of tree climbing and tree rigging ropes as they relate to work conditions, and in consideration of configuration and compatibility with other hardware and textiles in a rope system.

Knowledge of:

- 1. Types of rope construction (e.g., 3-strand, 16-strand, kernmantle, double-braid) and application
- 2. Rope diameter and length
- 3. Rope tensile strength (i.e., working load limit, safety factor)
- 4. Industry-accepted standards for rope selection and use (e.g., EN1891)

Skills in:

- 1. Selecting a rope that is appropriate for work conditions, the work application, and is an acceptable configuration with other hardware and textiles in the rope system
- 2. Inspecting rope for excessive wear, degradation, or damage

Task B: Select, inspect, and use tree climbing and tree rigging equipment that meets applicable regulations and industry-accepted standards to safely perform tree work while aloft.

Knowledge of:

- 1. Industry-accepted tree climbing saddle/harness, connecting links, work positioning lanyard friction management devices, and spurs/gaffs
- 2. Tree climbing hardware (e.g., locking carabiners and snaps, pulleys, hitch-tending pulleys, ascenders, mechanical hitches)
- 3. Rope tools (e.g., loop runner/webbing slings, two-eye prusiks, split-tails)
- 4. Tree rigging hardware (e.g., lowering devices, blocks, pulleys, double sheave pulleys)

- 1. Selecting tree climbing equipment that is appropriate for specifications of the project and meets regulations and industry-accepted standards for tree climbing
- 2. Inspecting climbing equipment for excessive wear, degradation, or damage
- 3. Configuring tree climbing equipment in accordance with manufacturer requirements (e.g., blocks/pulleys, friction hitch systems, rope systems)
- 4. Using tree climbing equipment
- 5. Connecting a tree climbing harness to a tree climbing rope system and connecting a work positioning lanyard to a tree climbing harness
- 6. Providing care and maintenance for tree climbing equipment



Task C: Tie knots that allow the tree climbing rope or tree rigging rope and/or equipment to work as intended.

Knowledge of:

- 1. Tree rigging rope positioning techniques (e.g., tag line, butt tie/tip tie)
- 2. Friction hitches (i.e., tree climbing hitches, tree rigging hitches)
- 3. Knot/hitch directionality (e.g., ascend only, ascend/ descend, descend only)

Skills in:

- 1. Attaching hardware (i.e., girth hitch, cow hitch with a better half, timber hitch)
- 2. Tying a termination knot (i.e., Buntline hitch, anchor hitch/anchor bend, double fisherman's bend/double fisherman's knot)
- 3. Tying an end-line rigging termination knot (i.e., clove hitch with two halves, running bowline)
- 4. Tying a rope joining knot (i.e., sheet bend, quick hitch)
- 5. Tying a secured footlock ascending knot (i.e., Klemheist, English Prusik)
- 6. Tying a tree climbing friction hitch (i.e., tautline hitch, Blake's hitch, Distel, Schwabisch, Valdotain Tresse [VT])

Task D: Assemble and configure a tree climbing system for a secure tree climbing tie-in.

Knowledge of:

- 1. Appropriate knots and/or tree climbing equipment for preventing carabiner side loading, accidental opening of the carabiner gate, and unintended friction-hitch interference
- 2. Conditions where stopper knots are required (e.g., running end of a climbing rope, running end of a split tail)

Skills in:

- 1. Assembling and configuring an industry-accepted tree climbing system including the tying of knots in a manner that prevents carabiner side loading, accidental opening of carabiner gates, and unintended frictionhitch interference
- 2. Constructing, dressing, setting, and using industryaccepted friction hitches for ascent and descent (e.g., tautline hitch, Blake's hitch, Distel, Schwabisch, Valdotain Tresse [VT])

Task E: Install an industry-accepted tree climbing rope system that allows safe entry to the tree.

Knowledge of:

- Tree climbing line installation procedures and methods (e.g., Stationary Rope System [SRS], Moving Rope System [MRS])
- 2. Use of a friction saver for climbing (e.g., ring and ring, pulley-based saver)
- 3. Tree characteristics and strength in relation to anchor point and anticipated forces in use

- 1. Selecting an appropriate initial climbing system anchor location
- 2. Using a throwline
- 3. Assessing overall branch strength based on wood strength, branch angle of attachment, branch diameter, decay, and other conditions
- 4. Testing the proof load for the selected anchor point prior to commitment and use



Task F: Ascend safely to the initial tree climbing system anchor location (i.e., tie-in point) while remaining secured with a minimum of one point of attachment to a secure anchor at all times or in line with regional regulations.

Knowledge of:

- 1. Industry-accepted friction hitches tied for tree climbing ascent and descent
- 2. Industry-accepted climbing techniques (e.g., hip thrust, branch climbing)
- 3. Rope advancement techniques

Skills in:

- 1. Rope setting and throwing
- 2. Evaluating friction hitch performance to ensure secure entry into a tree
- 3. Monitoring configuration of rope system during ascent to ensure that carabiner side loading, accidental opening of carabiner gates, and unintended friction-hitch interference is prevented
- 4. Handling the climbing line to allow a descent to ground with minimal disruptions (e.g., removal of rope bunching, redirecting rope around branches for an uninterrupted path to ground)
- 5. Reassessing the canopy for tree defects and other possible hazards to the tree worker, other workers, and other persons near the work zone
- 6. Installing a work positioning lanyard to prevent the lanyard from sliding down, up, or off the stem or branch, and to correct harness attachment points
- 7. Advancing the climbing system to a final anchor location (i.e., tie-in point) while remaining secured with a minimum of one point of attachment to a secure anchor at all times

Task G: Access different work stations in the tree and descend to the ground in a consistent and controlled manner.

Knowledge of:

- 1. Techniques to prevent swings, slips, and falls (e.g., appropriate angles for tree climbing rope system, not climbing above anchor point, minimizing slack buildup within systems, use of second secured point of attachment [work positioning lanyard or an additional tree climbing rope system])
- 2. Appropriate locations on tree parts to install a temporary second point of attachment for work positioning to ensure the security of the tree climber
- 3. Appropriate location for secondary load-bearing anchor point
- 4. Methods to determine if the tree climber has enough rope to descend to the ground

- 1. Planning workstation sequence and movements to reduce fatigue in the tree canopy
- 2. Using a tree climbing rope and friction hitch in a controlled manner while performing vertical and horizontal movements in the tree canopy
- 3. Verifying that the rope length will enable a descent to ground, and that an industry-approved stopped knot has been installed
- 4. Descending to ground in a consistent and controlled manner that does not damage the friction hitch or climbing rope, and does not risk injury to the tree climber

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Tree Removal

Task A: Developing a work plan for tree removal by considering the size and shape, species attributes of a tree, its health and structural condition, and the layout of the work zone.

Knowledge of:

- 1. Techniques for felling (e.g., assisted fell)
- 2. Techniques for aerial dismantlement (e.g., free fall, cut and fall)
- 3. Techniques for rigging for tree removal (e.g., butt/tip tie, speedline, balancing)
- 4. Techniques for estimating weight of tree parts
- 5. Tree characteristics that impact tree removal
- 6. Cutting techniques (e.g., directional notch, spear cut, drop cut, snap cut)

Skills in:

- 1. Evaluating how situational factors (e.g., wood fiber strength, wind, lean, cone or seed weight) impact tree removal
- 2. Developing a felling strategy considering terrain, built structures, lean, wind, natural direction of fall, targets and direction of safe drop zone to aid the workflow
- 3. Identifying the drop zone when removing sections from the canopy
- 4. Identifying appropriate cutting technique to guide tree parts into drop zone
- 5. Identifying appropriate cutting technique to guide tree parts into drop zone
- 6. Identifying appropriate rigging technique for guiding tree parts into the drop zone

Task B: Remove the tree by using appropriate equipment and safe work practices.

Knowledge of:

- 1. Chainsaw safety features
- 2. Techniques for felling (e.g., assisted fell)
- 3. Techniques for aerial dismantlement (e.g., free fall, cut and fall)
- 4. Techniques for rigging for tree removal (e.g., butt/tip tie, speedline, balancing)
- 5. Felling aids (e.g., wedge, felling bar)
- 6. Tree removal safety hazards (e.g., barber chair, loss of directional control, lean, wind)

- 1. Applying cuts (e.g., directional notch, spear cut, drop cut, snap cut)
- 2. Operating a chainsaw in accordance with industry standards and manufacture's specifications (e.g., two handed use of a chainsaw, correct use of chain brake)
- 3. Selecting and installing appropriate tools to achieve directional control (e.g., tagline, rigging rope and mechanical advantage, falling wedges)
- 4. Selecting and installing rigging ropes, blocks, and lowering devices
- 5. Determining the appropriate direction and angle for the felling notch
- 6. Incorporating an escape plan and route before initiating cuts into the tree

Task C: Limb and buck tree parts or felled trees for chipping or transport.

Knowledge of:

- 1. Identifying binds in tree parts being removed (i.e., compression, tension, shear, torsion) and sequencing cuts to reduce forces gradually by use of appropriate tools to reduce chances of the chainsaw being pinched (e.g., wedges)
- 2. Work positioning techniques to reduce repetitive strain injuries and minimize exposure to chainsaw kickback

Skills in:

- 1. Work positioning to maximize comfort and control and minimize exposure to kickback while handling a chainsaw.
- 2. Operating a chainsaw in accordance with industry standards and at an appropriate distance from tree climbing and rigging equipment
- 3. Removing tree parts to a size and weight that is appropriate given the work plan (e.g., extraction techniques, site constraints, weather, overall skills and abilities of all workers participating in the task)
- 4. Selecting and sequencing cuts appropriate for the type and intensity of bind in tree parts being removed (i.e., compression, tension, shear, torsion)
- 5. Maintaining chainsaws in accordance with manufacturer requirements

Tree Identification and Health

Task A: Describe important morphological structures and physiological processes associated with tree structure and growth.

Knowledge of:

- 1. Root anatomy and functions
- 2. Trunk and branch anatomy
- 3. Seasonal and species characteristics of tree anatomy
- 4. Tree life cycle
- 5. Leaf anatomy

Task B: Describe tree classification and nomenclature systems available to aid in tree identification and communication.

Knowledge of:

- 1. General tree classifications (e.g., coniferous, deciduous, palms)
- 2. Basic plant nomenclature principles and notation (i.e., genus and specific epithet)

Skills in:

Skills in:

1. Identifying root, trunk, and branch structures and process that are crucial for tree growth

- 1. Classifying tree species using accepted tree classification systems
- 2. Differentiating between common and scientific plant names

Weight: 10%

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Task C: Identify trees based on physical attributes and other resources.

Knowledge of:

- 1. Bark, stem, and leaf general characteristics
- 2. Twig anatomy (e.g., buds, scars)
- 3. Leaf types, characteristics, and arrangements (e.g., simple and compound leaves, needles and scales compared to broadleaves, opposite and alternate compared to whorled arrangements)
- 4. Flower and inflorescence types
- 5. Fruits, seed, and seedpods
- 6. Tree profiles (i.e., form, architecture), growth habits, and silhouettes

Skills in:

- 1. Observing and recognizing the form and growth habits of a tree
- 2. Observing and recognizing key tree anatomical structures (e.g., bark, leaves, buds, flowers)
- 3. Measuring dimensions of the tree
- 4. Referencing guides and comparing tree features with diagrams or written descriptions to aid in tree identification
- 5. Collecting tree samples that aid in tree identification
- 6. Utilizing available tree identification tools (e.g., dichotomous keys)

Task D: Recognize sources of stress that impact tree health and growth.

Knowledge of:

- 1. Signs and symptoms of stress
- 2. Biotic stressors (e.g., insects, fungi, wildlife)
- 3. Abiotic stressors (e.g., excessive or inadequate sunlight, poor drainage, physical injury)

Skills in:

- 1. Evaluating environmental and cultural sources of stress
- 2. Inspecting trees and the site for signs of stress
- 3. Assessing overall tree health

Task E: List structures and explain processes associated with trees' defense mechanism against decay.

Knowledge of:

- 1. Compartmentalization of decay in trees (CODIT)
- 2. Epicormic growth
- 3. Wound wood

Skills in:

- 1. Identifying previous wounding and CODIT response to wounding
- 2. Inspecting defects (e.g., cavities, narrow angle unions, seams) and evaluate indications of CODIT response
- 3. Determining if defects or wounding reduce wood strength

Pruning

Task A: Explain why pruning is undertaken and list the main, industry-accepted pruning objectives.

Knowledge of:

- Accepted industry standards for tree pruning (e.g., ANSI A300 Pruning Standard - Part 1 and accompanying ISA Best Management Practices, BS 3998)
- 2. What conditions require specific timing for pruning
- 3. Outcomes of tree pruning (e.g., benefits, consequences, flowering, fruiting)
- 4. Pruning objectives (e.g., structural development, risk mitigation, clearance, clear, density reduction, restoration, size management)

Skills in:

- 1. Pruning trees to promote good structure (e.g., reduce the likelihood of failure) while minimizing the impact on tree health
- 2. Identifying dead, diseased, infested, rubbing, declining, detached and/or broken branches

Weight: 20%





Task B: List commonly used, industry-accepted pruning tools and their use.

Knowledge of:

- 1. Scissor-type pruning tools (e.g., pruning shears, loppers, shears, pole pruners)
- 2. Pruning saws (i.e., hand saw, pole saw)
- 3. Chainsaws

Skills in:

Skills in:

- 1. Selecting the appropriate pruning tool for a given scenario
- 2. Operating pruning tools while aloft in accordance with industry-accepted standards
- 3. Securing pruning tools while aloft to prevent injury to other workers

Task C: List accepted types of pruning cuts and perform cuts to minimize impacts on tree health and promote longevity.

Knowledge of:

- 1. Branch union anatomy in relation to the pruning cut
- 2. Compartmentalization of decay in trees (CODIT)
- 3. Position and sequencing of pruning cuts
- 4. Types of pruning cuts (e.g., removal cut, reduction cut, heading cut, shearing cut)
- 5. Disinfection of tools (e.g., use of alcohol-based disinfecting solutions)
- 1. Determining where the pruning cut should be located according to branch union anatomy and industry-accepted best management practices
- 2. Predicting tree response to pruning cuts depending on tree species, age, wound size, timing, and overall tree health
- 3. Sequencing cuts to facilitate ease of handling and to minimize the potential for bark tearing beyond the point of branch attachment

Task D: Explain pruning practices that are detrimental to tree health and longevity.

Knowledge of:

- 1. Harmful pruning practices (i.e., topping, over-thinning, lion-tailing, flush cutting)
- 2. Consequences of improper cuts on tree health and structure

- 1. Anticipating potential impacts of detrimental pruning practices to tree health and structure
- 2. Explaining why certain pruning strategies, cuts, and wound dressings may be detrimental to tree health and longevity